AMENDMENT AND RESPONSE UNDER 37 C.F.R. § 1.116 - EXPEDITED PROCEDURE
Serial Number:10/578,786
Filing Date: May 9, 2006
Title: MULTI-LINE ADDRESSING METHODS AND APPARATUS

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REMARKS

This responds to the Final Office Action dated October 7, 2009.

Claims 1, 7, 15, 22-24, 30, 33-36 are amended, and no claims are canceled or added by this Response; as a result, claims 1-7, 15-18, 22-24, 26-27, 30-31, and 33-36 remain pending in this application.

Specification Objections

The amended disclosure is objected to because it contains an embedded hyperlink and/or other form of browser executable code on page of the Amendments to the Specification in the previous Response dated April 7, 2009. The Specification was amended to remove the embedded hyperlink and/or other form of browser executable code. Withdrawal of the objection to the Specification is respectfully requested.

Claim Objections

Claims 7 and 33 are objected to because of informalities. Claim 7 is objected to because of a minor grammatical error and claim 33 is objected to because of a minor grammatical inconsistency. Claims 7 and 33 are amended to correct the minor grammatical problems and not for reasons related to patentability. Withdrawal of the Objections and allowance of claims 7 and 33 is respectfully requested.

§ 101 Rejection of the Claims

Claims 22 and 33 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 22 and 33 include an amendment. An example of support for the amendments can be found on page 14 last paragraph. Applicant respectfully traverses the rejection as applied to the amended claims.

The Office Action rejects the claims because the preamble recites "A carrier carrying...," and the claimed carrier is not a process under 35 U.S.C. § 101. Applicant attempted to clarify term "carrier" in an amendment to the Specification in the previous Response dated April 7, 2009. In an effort to facilitate prosecution, and for reasons of clarity and not for reasons related

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to patentability, Applicant has amended claims 22 and 33. Withdrawal of the rejection and allowance of claims 22 and 33 is respectfully requested.

§ 103 Rejection of the Claims

Claims 1-6, 15, 23-24, 26-27, 30-31, 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamano (US 2004/0066363) in view of Smaragdis (US 2005/0021333). Claims 1, 15, 23-24, 30, 34-36 are amended to clarify certain aspects of the present subject matter and in an effort to facilitate prosecution, and for reasons not related to patentability. An example of support for the amendments can be found on page 7 of the Specification.

Applicant respectfully traverses the rejection because Yamano with Smaragdis does not establish each and every element of these claims. For example, Applicant cannot find in the cited portions of Yamano and Smaragdis, among other things,

> receiving image data for display, said image data defining an image matrix in which rows and columns of the image matrix correspond to rows and columns of image pixels of the display,

as similarly recited in the independent claims.

The Office Action asserts that "image data for display, said image data defining an image matrix" is found in Figs. 8-15 of Yamano (see e.g., Office Action pg. 5). The Office Action also asserts that the image matrix is the 8 X 1 driving matrix, but the matrix is exemplary and more signal lines than 1 would exist in an actual display (see, Office Action pg. 8).

However even if these assertions were correct (this assumption is for the sake of argument and not intended as an admission) the matrix of the type shown to the right in Fig. 9, 14, or 15 would be a matrix having a plurality of columns each corresponding to a signal line and a plurality of rows each corresponding to a time (see, Yamamo ¶¶0308, 0312, 328). Therefore, the "time X signal" line of Figs. 8-15 does not disclose the *image data defining an image matrix in which rows and columns of the image matrix correspond to rows and columns of image pixels of the display*, as presently similarly recited or incorporated in these claims.

Additionally, Applicant cannot find in Yamano and Smaragdis *factorising said image matrix into a product of at least a first factor matrix and a second factor matrix*, as presently similarly recited in independent claims 1, 7, 15, and 35. The Office Action asserts that the factorising is found in Yamano in Fig. 15 where the first factor matrix and a second factor matrix

are image data stored into a scan matrix (row) and column matrix (signal) with ROM storing the processing matrices.

Applicant respectfully disagrees with this characterization of Yamano. As set forth above, the "time X signal" line of Fig. 15 is different from the image matrix recited in the claims. Also, the "time X signal" line of Fig. 15 is derived by multiplying two matrices (see, Yamano Figs. 9, 14, and 15), whereas the present Application describes factorisation as a decomposition of an object (see e.g., pg. 7 and pg. 9 of the Application), in this case the image matrix, into a product of two factors the first and second matrices. To see that this factorisation/decomposition is different from the multiplication of Yamano, note that the left hand matrix, the "time X scan line," (as pointed out by the Office Action) is a processing matrix stored in ROM. Thus, the left hand matrix does not change with image data and is therefore not a result of factorisation of an image matrix.

Instead of factorisation, the process illustrated in Fig. 15 of Yamano appears to one that decomposes the image matrix into a set of basis functions: the matrix stored in ROM (time X scan line) defines an orthogonal set of basis functions (see e.g., Yamano ¶0299). Pre-multiplying the "scan line X signal line" by the "time X scan line" matrix in ROM represents the image vector in terms of the orthogonal functions defined in the (time X scan line) matrix in ROM (the matrix **H** in the terminology of Yamano). This multiplying provides a set of orthogonal PWM-type drive signals for driving the display (see, Yamano ¶¶0501,0802, 0803, 0847). The amendment in the independent claims is intended to further distinguish the image matrix from either the "scan line X signal line" or the "time X signal line" of Fig. 15 of Yamano.

Therefore, Yamano with Smaragdis does not establish each and every element of these claims.

Further, one of ordinary skill in the art would not reasonably be led to look to Yamano and Smaragdis for a method or device to drive an OLED display. This is at least because the present Applicants have determined that the methods referred to in Yamanov will not work for OLED displays. The Multi-line Select drive method described in Yamano relates to both positive and negative voltages to drive the display (see e.g., Yamano ¶¶0299-0328, and Figs. 9 and 14). Positive and negative voltages are meaningful for driving an LCD display because an LCD display devices respond to the RMS voltage applied to it, including both positive and

negative values. However, it is not possible to display negative values on an OLED display because the light emitting elements are diodes. The matrix (time X scan line) stored in ROM in Yamano defines a set of orthogonal vectors that produces both positive and negative values. Thus, the methods referred to in Yamano relate to LCD displays, but are unsuitable for OLED displays. Smaragdis relates to detecting and relating components of signals. Thus, one of ordinary skill in the art would not reasonably be led to look to a combination of Yamanov and Smaragdis for methods and devices for driving OLED displays.

The Office Action asserts that it would have been obvious for a person of ordinary skill in the art to have used non-negative matrix factorisation of Smaragdis in the display of Yamano because the suggestion/motivation would have been to detect components related to non-stationary signals, and to support the assertion the Office Action refers to paragraphs 0002, 0006-0008 of Smaragdis. However, the present Application relates to methods and devices to improve the lifetime of OLED displays. The examples cited in Smaragdis primarily relate to machine-based recognition of acoustic signals and videos. The Office Action does not explain why one of ordinary skill in the art would find detecting these signal components useful for OLED displays.

Further still, one of ordinary skill in the art would not reasonably be led to combine Yamanov and Smaragdis. Yamanov relates to delivering signals to a display panel using an MLS Drive method (see, Yamanov Abstract), and Smaragdis relates to detecting signal components related to non-stationary signals. It is not apparent why one of ordinary skill in the art would find detecting these signal components useful for the display panel of Yanaov. Also, at least for the reason that the MLS drive method of Yamanov is unsuitable for OLED displays (as explained previously), modifying Yamanov with Smaragdis would not lead to what is claimed by the Applicant. Therefore, one of ordinary skill in the art at the time of the present invention would not reasonably be led to combine Yamanov and Smaragdis.

Regarding claims 15 and 30:

In regards to claims 15 and 30, Applicant cannot find in Yamanov and Smaragdis,

wherein said image matrix comprises an m x n (row x column) matrix I and said first and second factor matrices respectively comprise an m x p (row x column) matrix W and a p x n (row x column) matrix H where p is less than or equal to the smallest of n and m and where $I \approx W.H$.

As explained above, the factor matrices are the result of a factorisation/decomposition, whereas Yamano relates to a pre-multiplication using permanently stored orthogonal functions in ROM. It is noted that the Office Action asserts that in Yamano the image matrix is the 8 X 1 driving matrix, and asserts that the driving matrix could contain 8 or more signal lines as shown in Figs. 50-53. However, even if the assertions were correct and using the notation of the claim language, even if the "time X signal line" of Yamano was considered to comprise an m X n matrix I, the index p in Yamano would index scan lines and, as pointed out in the Office Action, Yamano has more more of these than times and signal lines. Thus, Yamano would not establish "where p is less than or equal to the smallest of n and m."

In sum, a proper *prima facie* case of obviousness does not presently exist for these claims because Yamano with Smargdis fail to establish each and every element of these claims, and because one of ordinary skill in the art would not reasonably be led to combine Yamanov and Smaradgis or to look to the combination of Yamanov and Smaradgis for driving OLED displays. Accordingly, withdrawal of the rejection and allowance of claims 1-6, 15, 23-24, 26-27, 30-31, and 34-36 is respectfully requested.

Claims 7, 22, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamano (US 2004/0066363) in view of Smaragdis (US 2005/0021333) and Routley (GB 2389952). Claims 7, 22, and 33 include an amendment to clarify certain aspects of the present subject matter.

Applicant respectfully traverses the rejection because Yamano, Smaragdis, and Routley either separately, in the proposed combination, or with the reasoning provided in the Office Action do not establish each and every element of these claims.

For example, Applicant cannot find in the cited portions of Yamano and Smaragdis and/or the reasoning provided in the Office Action, among other things,

> *receiving image data for display, said image data defining an image matrix in which rows and columns of the image matrix correspond to rows and columns of image pixels of the display,*

as similarly recited in these claims at least for the reasons set forth above. The addition of Routley fails to establish the missing elements.

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Additionally, as set forth above, one of ordinary skill in the art at the time of the present invention would not reasonably be led to combine Yamano with Smaragdis.

Regarding Claim 7:

In regard to claim 7, Applicant cannot find *wherein said first and second factor matrices are configured such that a peak pixel brightness of said display is reduced,* as recited in the claim at least because, as explained above, none of Yamano, Smaradgis, or Routely refer to factorisation.

Additionally, Applicant cannot find *a peak pixel brightness of said display is reduced compared with a row-by-row driving of said display using said image data.* The Office Action concedes that Yamano with Smaragdis does not expressly disclose reducing a peak pixel brightness of said display compared with a row-by-row driving of said display using said image data. But states that this is disclosed in Routely by the controlling the brightness of a display by controlling the supply voltage (*see,* Office Action pg. 21). However, the technique of Routely relates to a row-by-row driving method which is incompatible with the method recited in claim 7. Also, because the claim recites that a peak pixel brightness of said display is reduced compared with a row-by-row driving of said display using said image data and Routely relates to a row-by-row driving method, Applicant respectfully submits that Routley is unable to disclose to one of ordinary skill how to reduce pixel brightness compared with row-by-row driving.

Thus, the proposed combination of Yamano, Smaragdis, and Routely does not establish each and every element of claim 7.

Further, the Office Action states that it would have been obvious to combine the reduced peak brightness of Routely with the driving of Yamano as modified by Smaradgis because of improved picture quality. However, Routely does not disclose that the reduced peak brightness improves picture quality, only that the efficiency is increased (*see e.g.,* Abstract) and that it achieves power savings (*see e.g.,* ¶0028).

Therefore, because Yamano, Smaragdis, and Routely do not establish each and every element of claims 7, 22, and 33, and because one of ordinary skill would not reasonably be led to combine Yamano, Smaragdis, and Routely, a proper *prima facie* case of obviousness has not been established. Accordingly, withdrawal of the rejection and allowance of claims 7, 22, and 33 is respectfully requested.

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Allowable Subject Matter

Claims 16-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant acknowledges the allowable subject matter with appreciation. However, claims 16 and 18 ultimately depend on base claim 1. Applicant believes claims 16 and 18 are allowable at least for the reasons given above with respect to claim 1. Accordingly, Applicant declines to amend claims 16 and 18 at this time.

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CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative at (612) 371-2172 to facilitate prosecution of this application.

If necessary, please charge any additional fees or deficiencies, or credit any overpayments to Deposit Account No. 19-0743.

Respectfully submitted,

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Date: February 5, 2010   By _/ Paul J. Urbanski /_

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being filed using the USPTO's electronic filing system EFS-Web, and is addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 5th day of February, 2010.

PATRICIA A. HULTMAN

Name   Signature